



the Bulletin

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The birth of an economic paradigm:

How STEM is Revolutionizing the Creative Economy

By: Sabuj Samaddar

When code becomes canvas and algorithms become art, we witness the birth of a new economic paradigm

Imagine Shakespeare's sonnets generated by neural networks, fashion designers using machine learning to predict trends, and musicians collaborating with AI to compose symphonies. This isn't science fiction; it's today's creative economy, where the boundaries between art and algorithm have dissolved into something revolutionary to empower economy.

We stand at the threshold of an "Algorithmic Renaissance," where Science, Technology, Engineering, and Mathematics (STEM) have become the invisible architects of human creativity and intellect. This convergence isn't merely changing how we create; it's fundamentally rewriting the economic DNA of entire industries. (Culture, Creative Industries and Sports | OECD, n.d.; Darbellay et al., 2023)



Culture, creative industries and sports | OECD. (n.d.).
<https://www.oecd.org/en/topics/sub-issues/culture-creative-industries-and-sports.html>

The Economics of Creative Technology

Financial implications are staggering. According to the United Nations Conference on Trade and Development (UNCTAD), global exports of creative goods more than doubled between 2002 and 2015, growing at twice the rate of traditional manufacturing. This represents acceleration into a new economic orbit.(UNCTAD's Creative Economy Outlook and Country Profile | Document Library, n.d.)

Consider gaming; the most visible example of STEM-creative synthesis. In 2023, the global gaming market exceeded \$180 billion, surpassing combined movie and music revenues. This industry exists purely at the intersection of advanced programming, artificial intelligence, physics simulation, and narrative storytelling. Every rendered frame represents thousands of code lines working with human imagination.(Video Games Market Value to Grow to Over \$200 Billion by 2023 | Press, n.d.)

Beyond gaming, Industry 4.0 principles: automation, smart manufacturing, Internet of Things have found unexpected applications in creative production. Fashion designers use 3D printing to create impossible geometries, while musicians employ AI to explore harmonic combinations human composers might never discover. Technology isn't replacing creativity; it's amplifying it exponentially.(Recommendations for Implementing the Strategic Initiative

INDUSTRIE 4.0. Final Report of the Industrie 4.0 Working Group - Acatech - National Academy of Science and Engineering, n.d.)

The Innovation Ecosystem

STEM-creativity relationship operates like a sophisticated ecosystem, where innovation flows in a multidirectional way. Cultural and creative industries (CCIs) don't just consume technology they actively drive innovation benefiting other sectors. The Organization for Economic Cooperation and Development documents how creative industries boost economy-wide productivity through knowledge spillovers, introducing new problem-solving approaches, aesthetic design principles, and consumer engagement strategies adopted by technology and industrial firms.(The Culture Fix CREATIVE PEOPLE, PLACES AND INDUSTRIES, 2022)

This cross-pollination works both ways. Data scientists analyze audience preferences to inform content creation. Engineers design immersive experiences blurring physical-digital boundaries. Programmers create digital rights management systems protecting creative works globally.

Yet despite growing integration, a significant gap persists. Many STEM graduates remain hesitant to pursue creative careers, citing unfamiliarity with artistic workflows or lack of career

guidance. This represents massive untapped potential technical talent that could accelerate creative innovation if properly channelled.



Julia Mallinowska from capturenow, Collaborative Creative Team Creatives Working on a Project, Canva.com, accessed August 12, 2025, <<https://www.canva.com/>>

Building Bridges Through Education and Policy

Addressing this gap requires fundamental changes in education and policy. Traditional separation between technical and creative disciplines is increasingly obsolete when success depends on interdisciplinary collaboration.

Progressive institutions experiment with "**STEAM**" curricula adding Arts to traditional STEM frameworks.

These programs teach students to think like both engineers and artists, approaching problems with analytical rigor and creative flexibility.

Hackathons for artists, maker-spaces in cultural districts, and collaborative computer science-fine arts projects break down artificial disciplinary barriers.(Maeda, 2013)

Countries like Indonesia and Colombia pioneer national strategies blending cultural entrepreneurship with digital training and technological infrastructure. These approaches recognize that future economies won't be built by choosing between creativity and technology, but by combining them strategically.(Restrepo & Márquez, 2013)

Smart policy frameworks can accelerate integration through targeted creative R&D incentives, robust intellectual property protections for digital content, and open innovation platforms facilitating STEM-creative collaboration.

Technology for Social Good

Beyond economic benefits, STEM-creative convergence offers powerful tools for addressing global challenges. Climate-aware games educate while entertaining. Digital storytelling preserves cultural heritage while making it globally accessible. Virtual and augmented reality create immersive educational experiences making complex concepts understandable.

The UN's Bridgetown Covenant explicitly recognizes the creative economy as a pathway for developing countries to leapfrog traditional development stages and enter high-value sectors creating sustainable, inclusive development models leveraging both human creativity and technological capability.(The Bridgetown Covenant: From Inequality and Vulnerability to Prosperity for All, 2021)

The Paradox of Progress

Technological revolution presents unprecedented opportunities and significant challenges. As AI becomes sophisticated, questions arise about creativity's nature. If AI composes indistinguishable music or generates emotionally moving art, what defines artistic authenticity?

These complex questions point toward thoughtful integration rather than wholesale replacement. Future creative professionals will likely succeed by collaborating with technology, using AI as creative partners, employing analytics to understand audiences, and leveraging digital platforms for global reach.

Conclusion: The Canvas of Tomorrow

The 21st century's defining characteristic may be its rejection of false dichotomies. We no longer choose between art and science, creativity and technology, human

expression and algorithmic efficiency. Instead, we weave these elements into something richer than any single thread.



Katya Wolf from Pexels, Digital Calligraphy on a Tablet, Canva.com, access August 12, 2025, <<https://www.canva.com/>>

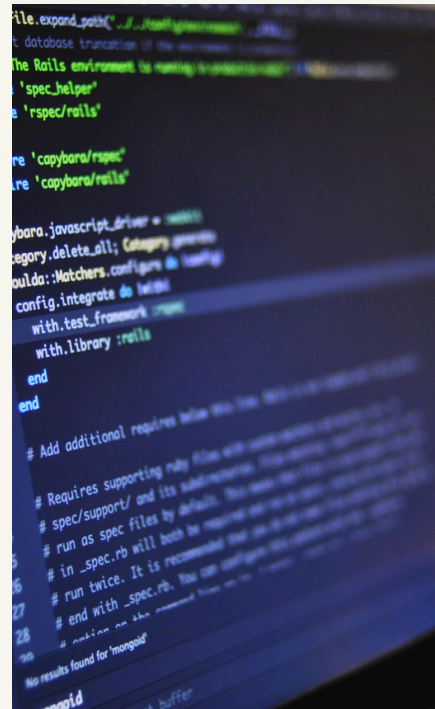
Nations, institutions, and individuals who thrive will master creative collaboration bringing together STEM expertise and artistic vision, technical precision and imaginative leaps, analytical thinking and emotional intelligence.

We stand at an Algorithmic Renaissance's beginning, where creation tools are being reinvented and creativity's definition expands. The profound question isn't whether machines can be creative, but whether

humans can learn to be creative with machines.

Tomorrow's canvas is painted in code, but the vision remains unmistakably human. In that fusion of algorithm and artistry, we find not creativity's replacement, but its amplification on previously unimaginable scales.

The future belongs to those mastering both technology and creativity understanding that their combination holds keys to economic prosperity, social progress, and human flourishing in the digital age.



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Bioinformatics:

Turning DNA into Dollars

By: Zara Grigoryan



What You Don't See in a DNA Test

If you're anything like me, you've definitely wanted to take a DNA test to find out more about your ancestry. But have you ever thought about the process behind those at-home DNA kits? 23andMe, for example, is a personal genetics company that offers this service. Here's how it works: you send a saliva sample, and they use bioinformatics to analyze your DNA. In return, you get information about your ancestry, health risks, and other genetic traits. But what is bioinformatics, and what does it have to do with commerce?

What is Bioinformatics?

Bioinformatics is a field that combines biology and computer science to analyze and interpret large and complex biological datasets, particularly those from genomics, proteomics, and systems biology. This data is analyzed using various comp-



-utational techniques like pattern recognition, machine learning algorithms, and data visualization.



Canva.com, access August 12, 2025, <<https://www.canva.com/>>

Real-World Impact: The BioNTech Example

Bioinformatics plays a huge role in industries such as healthcare, pharmaceuticals, and biotechnology. It has the potential to help businesses in these fields lead to breakthrough innovations by identifying patterns and trends in complex biological systems and making data-driven decisions that can lead to significant advancements. A good example of this is BioNTech, a German biotechnology company most

notably known for developing an mRNA-based COVID-19 vaccine in 2020. The company collaborated with Pfizer, an American biopharmaceutical company, to develop the vaccine, called Comirnaty. Bioinformatics played a huge role in the development of Comirnaty by enabling scientists to identify COVID-19's genetic structure quickly, thus finding and creating a remedy sooner. The solution also became the first to receive emergency use authorizations in the UK, the US, and the EU, and had an efficiency rate of 95%. Pfizer reported revenue of \$154 million, \$36 billion, and \$11.220 billion in 2020, 2021, and 2023, respectively. These triumphant results show how bioinformatics directly contributed to both public health success and commercial impact.

Bioinformatics as a Business

As you can probably already tell, bioinformatics isn't just scientists doing research in labs — it is also a growing business. It is used by companies globally to create new products, offer services, and even attract investors. For example, startups that build software to analyze DNA are raising millions of dollars to help doctors find better treatments. Some companies sell tools to big pharmaceutical companies so they can study diseases faster and more accurately.

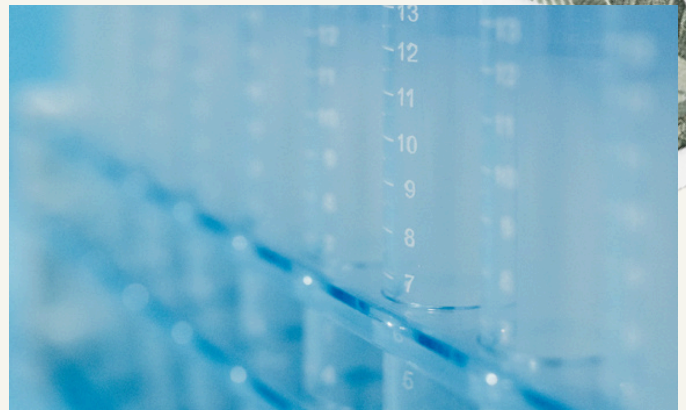
Why DNA Data Matters to Business

One reason bioinformatics is becoming

so valuable in business is because of the amount of data we now have. Every time someone gets their DNA sequenced, huge amounts of information are created. Companies that know how to organize and understand this data can make better decisions, whether it's finding a new drug or figuring out what treatment will work best for a patient. This saves both time and money, which is why so many companies are investing in this field. It's not just about helping people — it's also about doing it in a faster, smarter, and more affordable way.

A Future Fueled by Bioinformatics

Bioinformatics shows how science and business can work together to make a real impact. It helps companies come up with new ideas, improve healthcare, and even save lives — all while growing as a successful industry. Only time will tell how bioinformatics will become more important in both the lab and the business world. It's a perfect example of how turning DNA into data can also turn into something valuable.



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Space Tourism:

Is This the Future of Space?

By: Celine Soerjanto

Introduction

Funding for space projects mainly rely on the following: private investments, government appropriations and programs, crowdfunding platforms and grants or competition prizes (Lee, 2025). Over the last two decades, however, there has been a large influx in private capital, leading to numerous new innovations and advances in the technology and development of space engineering and projects (The Organisation for Economic Co-operation and Development, 2024). As celebrity involvement increases, so does the commercialization of space, allowing companies like SpaceX, Blue Origin and Virgin Galactic to sell tickets and opportunities for individuals to visit space in an act of tourism, a growing industry.

A Luxury Experience

American engineer and entrepreneur Dennis Tito was the first to become a



Blue Origin's New Shepard Mission Marks 11th Human Flight and First All-Woman Crew Since 1963, Forbes
(<https://www.forbes.com/sites/gemmaallen/2025/04/20/from-blastoff-to-backlash-blue-origins-all-female-mission-under-fire/>)

space tourist in 2001, paying USD 20 million to the Russian space agency Roscosmos for a week trip to the International Space Station. Other multi-millionaires and billionaires have become space tourists as well, including Mark Shuttleworth, Jeff Bezos and Jared Isaacman, making space tourism the epitome of recreational luxury to earn a revered and awe-struck social status. Over 30 space tourism trips have since

launched to date, with the most affordable space tourism trip being within the staggering range from USD 200,000 to USD 300,000 for a suborbital flight to experience a few minutes in space (Morletto, 2025). Target demographics, nonetheless, remain to be exclusively for ultra-high-net-worth-individuals (UHNWIs) due to their private investments and the immense costs to cover, including extensive aeronautics training, spacecraft logistics, and crew support.

While some may view space tourism as an advancement in science and society, backlash has occurred during a time of economic struggle for many. Jeff Bezos's company Blue Origin launched the first all-female crew since 1963, with the flight being led by Lauren Sánchez, Jeff Bezos's fiancée, and including singer Katy Perry, bioastronautics researcher and civil rights advocate Amanda Nguyen, film

producer and socialite Kerianne Flynn, journalist Gayle King, and former National Aeronautics and Space Administration (NASA) engineer Aisha Bowe. Public reception was mixed, as some admired the feminist representation of women, while some criticized many aspects of the mission. Perry additionally sang "What A Wonderful World" and teased her tour setlist during the flight, facing backlash from commentators who claimed that the mission was "tone deaf" amidst the impeccable timing of the mission and the lack of qualifications held by multiple members of the crew. The public, unfortunately, focused on the negative scrutiny against the mission despite Nguyen and Bowe having made sacrifices to achieve their position along the crew, with Nguyen being the first woman of Vietnamese heritage to fly into space (Allen, 2025).

Future Endeavors

There is a lack of scientific exploration and experimenting during these space tourism missions, which may seem like a waste of money to some, considering the environmental impacts of these projects. Combustion exhaust from rocket thrusters modifies the thermochemistry dynamics in the atmosphere, releasing a significant amount of water vapor as well. Nitrogen is also converted into nitrogen oxides, polluting the atmosphere as it contributes to climate change and global warming (Mann, 2022).



Crew of Blue Origin's New Shepard rocket. From Why Is Blue Origin Facing Backlash? by G. Nicolas, 202, People (<https://people.com/blue-origin-flight-controversy-explained-11717118>).

Rocket launches emit hundreds of times more carbon soot particles than a plane, yet only accounts for 3% of the global warming effects caused by human-caused soot. Plans of development, though, could change this, as studies conclude that the soot released by increased space activity could disrupt atmosphere circulation and deplete the ozone layer at a rate almost 500 times more than emissions from planes or ground-level machines (Diab, 2024).

It appears, unfortunately, that there is a lack of environmental care when developing space tourism projects, as the global space tourism market is estimated to reach over USD 13.08 billion by 2030 (Morletto, 2025). North America is driving the most interest in space tourism, with NASA donating to three different companies over USD 400 million in total to continue their development of technology and science to accommodate the rising demand for space tourism. Another American-based space tourism company, Orion Span, attempted to develop the first luxury space hotel called the “Aurora Space Station”, which was set to orbit around the Earth and allow visitors to stay for 12 days each trip. This project was supposed to launch in 2021 and allowed guests in 2022, but ambitions of this program, however, will remain unfulfilled as the project was abandoned in 2023 before it was launched (Elphick, 2024). Other companies like SpaceX aim to make space tourism more affordable, with an increase of zero gravity experiences also becoming a booming industry

recently.

Conclusion

Ultimately, space tourism is currently accessible to the wealthy, making it a highly luxurious experience. From failed plans of space stations to future plans of more space tourism at more affordable prices, space tourism has yet to reach its peak, leaving much to explore in the future. Environmental



Canva.com, access August 12, 2025, <<https://www.canva.com/>>

concerns, like carbon emissions and pollutant gases, is important to consider despite the excitement that is expected to come from an increase in access to viewing the world from outer space, in which space tourism would be likely to develop into a more recreational experience that many can afford without being a wealthy individual or a person with years of aeronautics training, as the Blue Origin space mission has shown recently. It is uncertain whether it will be as commercialized as aircrafts and aviation, but it is certain that there will be some development in that particular sector, increasing the number of space tourists in the future.



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From Code Flow to Cash Flow:

How a Dropout Software Engineer Pays Your Bills


By: Davit Tamazyan



Let's say your salary lands in your bank account, your rent is automatically deducted from the total amount, or your food order gets processed in seconds. For one, it may seem like an overly simple one-click operation, but behind it is a very complicated system that makes sure it never fails. What most people don't realize is that the brains of those control systems are not always Ivy League economists or certified financial planners - they're often software engineers, many of whom never graduated from college. In fact, some of the most important systems that manage money today were built — or broken — by self-taught programmers, who never intended to work in finance at all.

Engineers of Economy

Commerce runs on code. In fact, almost everything nowadays runs on lines of code. The backend systems of your bank to global supply chain platforms, and fintech apps like PayPal, Stripe, or Revolut are all made easy for you to understand and coordinate through. In a company's payroll system, a few hundred lines of Python code can determine when and how employees get paid. Another 100+ lines of code written determine your balance, account activity, and many other functionalities. In investment platforms, trading bots, pricing engines, and functional systems operate entirely on real-time data and complex algorithms written by developers who may never have taken a finance course.



One Smart Contract to Rule Them All

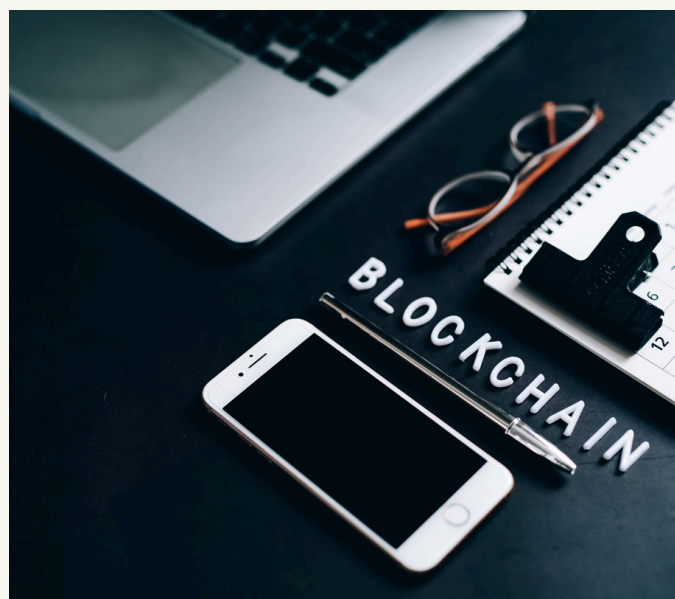
Blockchains like Ethereum have introduced a new kind of “programmable” money through smart contracts - such self-executing pieces of code that automatically enforce agreements between parties. These are open-source programs written primarily in languages like Solidity, and they power decentralized finance (DeFi) applications, NFT platforms, and even algorithmic stablecoins.

However, the most interesting part is that a single smart contract - often under 1,000 lines of code — can manage millions or even billions of dollars in assets. That’s without a middleman or huge human activity.

For example, Uniswap, a decentralized exchange that lets people trade crypto assets without a bank, is essentially just a few smart contracts deployed on the Ethereum blockchain. In 2021, it had over \$1 trillion in trading volume, largely governed by open-source code and ML. So, the crazy twist is that it was initially developed by a self-taught engineer working from his apartment.

This is the “dropout software engineer” paying your bills - or at least, moving your money.

But with great power comes great risk. Since this new economy runs on code, any bug can be a murder - and it has been. Let’s educate ourselves on some of history’s biggest failures in finance.





Case Study 1: The DAO Hack (2016)

In one of Ethereum's earliest high-profile projects, "The DAO" (a decentralized autonomous organization), a vulnerability in a smart contract was exploited, which led to an attacker to siphon off \$60 million worth of Ether. The code worked, but not as intended, and the results were horrific. It was such a crisis that Ethereum had to undergo a controversial "hard fork" to restore the stolen funds.

Case Study 2: Solana's Network Outages

Solana, another blockchain platform used for DeFi and NFT markets, has experienced multiple outages due to bugs and overloads in its core functional code. During one such outage, trading stopped for hours, causing millions in lost opportunity costs for investors and platforms that depended on constant liquidity.



Case Study 3: Wormhole Bridge Exploit (2022)

A single vulnerability in the Wormhole bridge's smart contract — a tool used to transfer tokens between blockchains - enabled hackers to exploit the system and get access to over \$320 million. This was a pure software-level bug that was likely overlooked due to an incomplete or rushed code audit.



Conclusion: Code Is the New Capital

In a world where commerce is almost completely digital, code is no longer just a tool — it's a form of economic infrastructure. It's like the backbone and the neural system of thousands of companies, operating 24/7. From banking apps to smart contracts, a few lines of logic can now control how millions move through the system.

STEM & Commerce

Can or should their ends meet!

By: Aaiva Tripathi

STEM is the combination of Science, Technology, Engineering, and Mathematics, but when it is combined with commerce it becomes a real-life superpower in the modern age. This is like you scratching your experimental mind combined with a business model which makes it remunerative for adaptation in real world, which in today's world is most important. Think of the journey. To give shape to learning of STEM, technological resources like computers are handy to manage and store the data with forecasts while the idea is getting shaped with scientifically coming up with its test case, controlled experiments and eventually using different fields of engineering to scale everything up. Add the last ingredient to the flow, which is money and profits and there you have, a great commercially viable idea using STEM.

Who could have thought that Commerce and STEM can coexist! Let me take you to a real-world example where I experienced it first hand – all at



Walking Through a Songline [Photograph]. MuSo.
<https://www.museumofsolutions.in/>

one place! Well, it is a place in Mumbai (India) called Museum of Solutions (MuSo)!

I had recently visited MuSo and was wonderstruck by the hands-on activities and more. It also has many Interactive play zones called the *Play Lab* where you can learn STEM concepts directly such as solving puzzles, using and learning the process of ramps and pulleys and other

games where Science (the S in STEM) is used to understand the logic between multiple experiments of natural elements like air, water and blocks. Also, there are activities like building your own graphical story using technology (the T in STEM) giving wings to imagination.

Secondly, there is also a *Make Lab* which wake up the inner maker in you! Over here students can work on robots and architecture using the help of engineering (the E in STEM). We can also unleash our creative side along with concepts where mechanical and electrical engineering concepts are interjoined with activities like build your own circuit with multiple components like wires, bulbs, LED and more.

Last but not the least, we have the *Discover lab* where we understand how we can use the concept of STEM to solve real life crisis like water pollution as one of the biggest. It gave a social angle to the learnings. The discovery lab has a small documentary over the same and also a digital question and answer game to tell if you are a responsible water citizen or not. You all

better be one!! This floor also uses a lot of technology through audio and visual (the T in STEM).

While MuSo operates as a not-for-profit place and have support of a leading Indian corporate house, I found that they do charge a certain admission/ entry fee from visitors. These amount which are collected are used for maintenance, salary and adding new activities. As I mentioned earlier that it is not for profit organization which means that they don't work for profit motive.

As I started with, I firmly believe that it is indeed a great collaboration that STEM and Commerce can form together. These types of establishments where concept of STEM is being elaborated should be more and spread across or country. These activities should be more in number to give students a first-hand experience of how to use the concept of STEM in real life. But to increase MuSo like places, it requires more and more such centres are developed and that cannot be done only from support of Corporate Social Responsible funding, philanthropic bent of large business houses but that it should be also profit generative model which encourages more and more businessmen coming into this setup. If Government starts identify some such idea and support with some low initial cost and allow to charge a rationale or subsidised fee were there could be low or no tax on the businessmen, we may see a storm of well-meaning people joining and taking it wider.

